

CLAIMS:

1. A fluidising admixture for use with sprayable cementitious compositions, the admixture consisting of

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(1) 2-phosphonobutane-1,2,4-tricarboxylic acid;

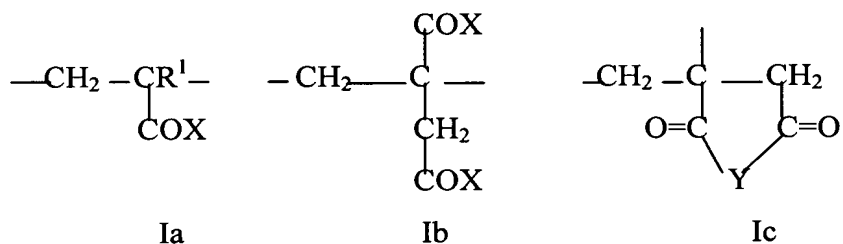
(2) optionally, citric acid; and

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(3) at least one polymer derived from ethylenically-unsaturated mono-or dicarboxylic acids, and characterised in that the polymer consists of

a) 51-95 mole % of moieties of formula 1a and/or 1b and/or 1c

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wherein R^1 = hydrogen or a C_{1-20} aliphatic hydrocarbon residue;

$X = O_a M$, $-O-(C_m H_{2m} O)_n - R^2$, $-NH-(C_m H_{2m} O)_n - R^2$,

M = hydrogen, a mono-or divalent metal cation, an ammonium ion or an organic amine residue;

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$a = 0.5$ or 1 ;

R^2 = hydrogen, C_{1-20} aliphatic hydrocarbon, C_{5-8} cycloaliphatic hydrocarbon or optionally substituted C_{6-14} aryl residue;

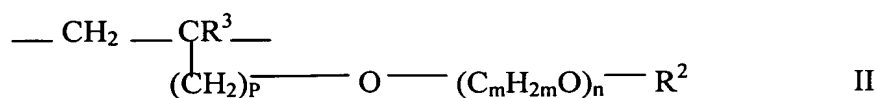
$Y = O$, NR^2 ;

$m = 2-4$; and

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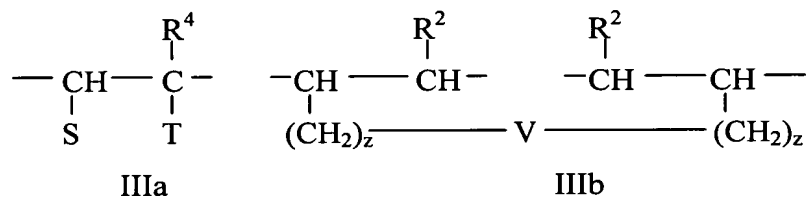
$n = 0-200$

b) 1-48.9 mole% of moieties of the general formula II

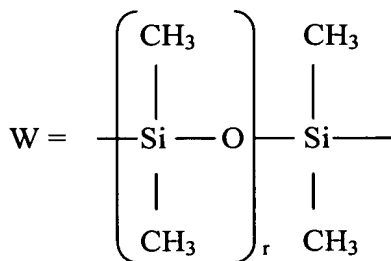


wherein R^3 = hydrogen or C_{1-5} aliphatic hydrocarbon;
 $p = 0-3$; and
 R^2 has the meaning given previously;

c) 0.1-5 mole % of moieties of Formulae IIIa or IIIb



wherein $\text{S} = \text{H}, -\text{COO}_a\text{M}, -\text{COOR}^5$
 $\text{T} = \text{U}^1\text{---}\underset{\text{CH}^3}{\text{(CH---CH}_2\text{---O)}}_x\text{---(CH}_2\text{---CH}_2\text{O)}_y\text{R}^6$
 $-\text{W-R}^7$
 $-\text{CO-[NH-(CH}_2\text{)}_3\text{]}_s\text{---W-R}^7$
 $-\text{CO-O-(CH}_2\text{)}_z\text{---W-R}^7$
 $-\text{(CH}_2\text{)}_z\text{---V---(CH}_2\text{)}_z\text{---CH=CH-R}^2$
 $= -\text{COOR}^5$ when S is $-\text{COOR}^5$ or COO_aM
 $\text{U}^1 = -\text{CO-NH-}, -\text{O-}, -\text{CH}_2\text{O-}$
 $\text{U}^2 = -\text{NH-CO-}, -\text{O-}, -\text{OCH}_2\text{-}$
 $\text{V} = -\text{O-CO-C}_6\text{H}_4\text{-CO-O-}$ or $-\text{W-}$



$\text{R}^4 = \text{H}, \text{CH}_3$

R^5 = a C_{3-20} aliphatic hydrocarbon residue, a C_5-C_8 cycloaliphatic hydrocarbon residue or a C_6-14 aryl residue;

$R^6 = R^2$, $-\text{CH}_2-\underset{\text{R}^4}{\text{CH}}-\text{U}^2-\underset{\text{R}^4}{\text{C}}=\underset{\text{S}}{\text{CH}}$

$R^7 = R^2$, $-\text{[(CH}_2\text{)}_3\text{-NH]}_s\text{-CO-}\underset{\text{R}^4}{\text{C}}=\underset{\text{S}}{\text{CH}}$

$-(\text{CH}_2)_z\text{-O-CO-}\underset{\text{R}^4}{\text{C}}=\underset{\text{S}}{\text{CH}}$

wherein

$r = 2-100$

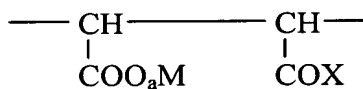
$s = 1, 2$

$z = 0-4$

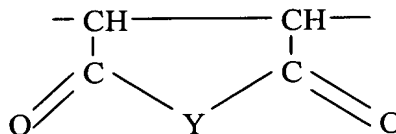
$x = 1-150$

$y = 0-15$

d) 0-47.9 mole % of moieties of the general formula IVa and / or IV b:



IVa



IVb

wherein a, M, X and Y have the significances hereinabove defined.

2. A fluidising admixture according to claim 1, in which

a) the moiety is according to formula Ia;

R^1, R^2 are independently H or CH_3 ;

$\text{X} = \text{O}_a\text{M}, -\text{O}-(\text{C}_m\text{H}_{2m}\text{O})_n\text{-R}^2$

$\text{M} = \text{H}$ or a mono-or divalent metal cation;

$a = 1$;

$\text{Y} = \text{O}, \text{NR}^2$;

m= 2-3; and

n= 20-150;

b) R^2, R^3 are independently H or CH_3 ; and

p = 0-1;

c) the moiety is according to formula IIIa;

S = H, $-COO_aM$, $-COOR^5$

T = $U^1-(CH-CH_2-O)_x-(CH_2-CH_2O)_yR^6$

$\begin{array}{c} | \\ CH^3 \end{array}$

$-CO-[NH-(CH_2)_3]_s-W-R^7$

$-CO-O-(CH_2)_z-W-R^7$

R^4, R^5 are independently H, CH_3 ;

$R^6 = R^2, -CH_2-\underset{\begin{array}{c} | \\ R^4 \end{array}}{CH}-U^2-\underset{\begin{array}{c} | \\ R^4 \end{array}}{C}=\underset{\begin{array}{c} | \\ S \end{array}}{CH}$

$R^7 = R^2, -[(CH_2)_3-NH]_s-CO-\underset{\begin{array}{c} | \\ R^4 \end{array}}{C}=\underset{\begin{array}{c} | \\ S \end{array}}{CH}$

$-(CH_2)_z-O-CO-\underset{\begin{array}{c} | \\ R^4 \end{array}}{C}=\underset{\begin{array}{c} | \\ S \end{array}}{CH}$

wherein

$U^1 = -CO-NH-, -O-, -CH_2O-$

$U^2 = -NH-CO-, -O-, -OCH_2-$

x = 20-50;

y = 1-10; and

z = 0-2.

3. A fluidising admixture according to claim 2, in which

a) the moiety is according to formula Ia;

$R^1 = H$;

$R^2 = CH_3$;

X = O_aM ;

M = a mono-or divalent metal cation;

$Y = O, NR^2$;

$m = 2$; and

$n = 25-50$;

5 b) $R^2, R^3 = H$; and
 $p = 0$;

c) the moiety is according to formula IIIa;

$S = H, -COO_aM$;

10 $T = U^1 - (\underset{\underset{CH^3}{|}}{CH-CH_2-O})_x - (CH_2-CH_2O)_y R^6$

$-CO-O-(CH_2)_z-W-R^7$

$R^4, R^5 = H$;

15 $R^6 = R^2, -CH_2-\underset{\underset{R^4}{|}}{CH}-U^2-\underset{\underset{R^4}{|}}{C}=\underset{\underset{S}{|}}{CH}$

$R^7 = R^2, -[(CH_2)_3-NH]_s-CO-\underset{\underset{R^4}{|}}{C}=\underset{\underset{S}{|}}{CH}$

20 $-(CH_2)_z-O-CO-\underset{\underset{R^4}{|}}{C}=\underset{\underset{S}{|}}{CH}$

wherein

$U^1 = -CO-NH-$;

$U^2 = -NH-CO-, -O-, -OCH_2-$

$x = 20-50$;

25 $y = 5-10$; and

$z = 1-2$.

4. A method of imparting flow to a cementitious composition, comprising the addition thereto of an admixture according to any one of claims 1-3.

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5. A method of spraying a cementitious composition by preparing a cementitious mix and conveying the mix to a spray nozzle, there being added to the mix at preparation an admixture according to claim 1.